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APR 17 2007

REMARKS

Claims 1 and 4-13 remain in the application.

The Rejections:

In the Final Office Action dated January 17, 2007, the Examiner rejected Claims 1, 4-7 and 13 under 35 U.S.C. 103(a) as being unpatentable over Baranda (WO 99/43589) in view of Kinoshita (US-5891561) in further view of Danhauer (US 2002/0098935).

Referring to Claims 1 and 4-7, the Examiner stated that Baranda discloses a drive motor (42) mounted at a head of an elevator shaft and having a drive pulley; an elevator car (16) movable in the elevator shaft; a counterweight (48) movable in the elevator shaft and arranged laterally of the elevator car (See Pg. 2 - Pg. 31. 17 & Fig. 2), a flat-belt-like support means supporting the elevator car by under looping and engaging the drive pulley. The Examiner commented that Baranda does not disclose the support means being a wedge-ribbed belt having a running surface facing the drive pulley and a plurality of ribs and grooves formed with an angle in the range of 80 to 100 degrees in the running surface and extending in parallel in a longitudinal direction of the support means.

The Examiner stated that Kinoshita discloses a wedge-ribbed belt (10) with ribs and grooves being one of triangular-shaped and trapezium-shaped in cross section (See at least Col. 31. 12-30 and at least Fig. 1). According to the Examiner, Danhauer discloses a belt (10) with a plurality of ribs and grooves formed in the running surface and extending in parallel in a longitudinal direction on the support means (See Sect. 0017 & Figs. 1-2), and further discloses that the belt (10) is provided with a plurality of transverse grooves (34) (See Sect. 0025) and that the grooves are provided at an inclined angle. Additionally, the Examiner notes that the belt (10) has at least two wedge-ribbed belt strands arranged in parallel (See Figs. 1-2). According to the Examiner it would have been obvious to a person of ordinary skill in the art to modify the apparatus of Baranda to include the teachings of Danhauer and provide a wedge-ribbed belt with a plurality of ribs and grooves formed in the running surface as well as transverse grooves and ribbed strands formed at an inclined angle as taught by Kinoshita and Danhauer so that the belt could provide better traction, increased flexibility, running quietness, and a higher load capacity.

Referring to Claim 7, the Examiner commented that Baranda does not disclose that the drive pulley has an external diameter in a range of 70 to 100 millimeters, but it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the apparatus of Baranda to include drive pulleys that were in the range of 70 to 100 millimeters so that greater torque and lifting capacity could be achieved.

Referring to Claims 9-10, the Examiner stated that Baranda discloses that the drive motor and drive pulley are mounted in a space which lies between one side of the elevator car, when the elevator car is standing in an uppermost position in the elevator shaft, and an adjacent wall of the elevator of the elevator shaft and an is of the drive pulley is arranged horizontally and parallel to the one side of the elevator car (See Fig. 2), and further discloses a belt connected at one end of the side of the elevator car at a first support means fixing point (104), which extends from the first support means fixing point vertically upwards to a side which faces the elevator car, of a periphery of the drive pulley, loops around the drive pulley by 180 and then runs vertically to a second support means fixing point (102) at the counterweight (See Fig. 3). The Examiner commented that Baranda does not disclose that the belt connected at one end of the elevator is a wedge-ribbed belt, but it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the apparatus of Baranda an implement an wedge-ribbed belt as taught by Kinoshita for reasons as discussed above.

The Examiner rejected Claim 8 under 35 U.S.C. 103(a) as being unpatentable over Baranda in view of Kinoshita and Danhauer, and in further view of Bauer (US-2002/0185338). The Examiner commented that Baranda does not disclose that the drive motor and drive pulley are mounted on a drive bracket attached to at least one guide columns. According to the Examiner, Bauer discloses that a drive motor (14) and a drive pulley (13) are mounted on a bracket attached to at least one of the guide columns (See at least Sect. 0017 & at least Fig. 2), and it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the apparatus of Baranda in view of Kinoshita & Danhauer to include the teachings of Bauer and provide a bracket so that the drive motor and drive pulley could be mounted together so that when forces were exerted as a result of the elevator they would not be loaded on the walls.

The Examiner rejected Claims 11-12 under 35 U.S.C. 103(a) as being unpatentable over Baranda in view of Kinoshita and Danhauer, and in further view of Mori (US-2002/0112924). The Examiner commented that Baranda does not disclose a belt transmission means for coupling the drive motor to the drive pulley or that the belt transmission means includes at least one cogged belt and a wedge-ribbed belt coupling the drive motor to the drive pulley. The Examiner stated that Mori discloses a belt transmission means coupling the drive motor (52) to the drive pulley (51) (See Sect. 0040 & Figs. 1,19), Kinoshita discloses a wedge-ribbed belt (10) with ribs and grooves being one of triangular-shaped and trapezium-shaped in cross section (See at least Col. 31. 12-30 and at least Fig. 1), Danhauer discloses a belt (10) with a plurality of ribs and grooves formed in the running surface and extending in parallel in a longitudinal direction on the support means (See Sect. 0017 & Figs. 1-2), and it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the apparatus of Baranda in view of Kinoshita and Danhauer and to provide a belt transmission that coupled the drive motor and drive pulley that consisted of at least one of a cogged belt and a wedge-ribbed belt as taught by Mori so that a cogged and wedge-ribbed belt so that the elevator could benefit from an increased load capacity and better traction.

The Response:

If the Examiner does not allow the claims as presented, Applicants respectfully request that the Examiner reset the time for reply and communicate a new Office Action that responds to the following items missing from the pending Final Office Action:

1) The Examiner did not indicate whether the proposed changes to Figs. 3 and 4 included in the prior Amendment are acceptable.

2) On Page 2 of the Final Office Action, the Examiner rejected Claims 1, 4-7 and 13. However, the Examiner did not provide any description of how the cited references are applied to Claim 13.

3) On Page 4 of the Final Office Action, the Examiner discusses Claims 9-10. However, Claims 9-10 are not listed in the rejection on Page 2 or any of the other rejections.

Claim 1 recites a flat-belt-like support means supporting said elevator car and engaging said drive pulley, said support means being a wedge-ribbed belt having a running surface facing

said drive pulley and a plurality of ribs and grooves formed in said running surface and extending in parallel in a longitudinal direction of said support means, said ribs and grooves being one of triangular-shaped and trapezium-shaped in cross section and formed with lateral flanks at an angle in a range of 80° to 100°. Claim 13 includes similar limitations.

The Examiner again rejects independent Claims 1 and 13 as being unpatentable over Baranda in view of Kinoshita, and further in view of Danhauer. In response to Applicant's arguments in the previous Amendment, the Examiner stated that Applicants' focus on grooves being formed with lateral flanks at an angle in a range between 80° to 100°" is unpersuasive because Danhauer teaches that it is known in the art to provide grooves with lateral flanks formed at an inclined angle and it would have been have been obvious to one having ordinary skill in the art at the time of the invention to provide the grooves formed with lateral flanks at an angle in a range of 80° to 100°, since it has been held that the provision of adjustability, where needed, involves only routine skill in the art to which it would have been obvious to do so in order to increase traction capability, running quietness, and load capacity.

This is not a case of "adjustability". Applicant notes that the Examiner has failed to cite any art showing a wedge-ribbed belt having lateral flanks arranged with an angle in the range recited in Applicant's claims. There is a reason for this failure to locate such prior art. Generally known and available wedge-ribbed belts (also called poly-v belts) have ribs and grooves with lateral flanks arranged at a wedge angle in a range of 35° to 40°. See the attached two data sheets. Applicant is unable to find any documents showing wedge-ribbed belts having wider wedge angles between the flanks of their ribs and grooves, and has not found single v-belts having wedge angles of more than 60°.

The wedge-ribbed belts according to the claimed invention, having wedge angles between the flanks of their ribs and grooves in a range of 80° to 100°, are the result of extensive research and test work in order to find an optimum belt for suspending and driving elevator cars. Findings resulting from said research and test work include:

1. A wedge-ribbed elevator belt made from elastomeric material and having ribs with an edge angle smaller than 80° to 100° may cause the following problems:

- the tensioned belt running about a belt sheave generates a high noise level due to the fact that the ribs are strongly being jammed between the flanks of the corresponding grooves of the sheave.
- due to said jamming effect, there is the risk that the drive sheave of the elevator further lifts the elevator car (respectively the counterweight) if, due to a control failure, the counterweight (respectively the elevator car) strikes its lower limit stop.

2. If the wedge-ribbed elevator belt has ribs with the angle being bigger than 80° to 100°:

- the lateral guiding of the belt on its sheaves isn't guaranteed; i.e. there is a high risk of derailment of the belt from the sheaves.
- the required traction (friction) between the drive sheave and the wedge-ribbed belt may not be reached.

As stated in Applicant's specification in the paragraph beginning on Page 7, at Line 30:

> In the case of the embodiment **12.1** according to Fig. 3, a plurality of ribs **23.1** and grooves **24.1** formed in a running surface have a triangular cross-section. In the case of the embodiment **12.2** according to Fig. 4, a plurality of ribs **23.2** and grooves **24.2** formed in the running surface have a trapezium-shaped cross-section. An angle "**b**" present between the flanks of a rib or a groove influences the operating characteristics of a wedge-ribbed belt, particularly the running quietness thereof and the traction capability thereof. Tests have shown that it is applicable within certain limits that the larger the angle "**b**" the better the running quietness and the worse the traction capability. With consideration of the demands on running quietness as well as traction capability the angle "**b**" should lie between 80° and 100°. An optimum compromise between the opposing requirements is achieved by wedge-ribbed belts in which the angle "**b**" lies at approximately 90°.

Thus, one of ordinary skill in the art would not increase the angle from the typical range of 35° to 40° since it is known that there would be a loss of traction capability. For these reasons, Applicant is firmly convinced that the cited prior art would not lead a person having ordinary skill in the art to provide a wedge-ribbed elevator belt having ribs and grooves formed with lateral flanks at an angle in a range of 80° to 100°.

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The Examiner stated that the prior art made of record and not relied upon is considered pertinent to Applicants' disclosure. The Examiner cited Heinz (US-2003/0121729) as disclosing a "Lift Belt System" comprising a belt with grooves being one of triangular-shaped and trapezium-shaped in cross section and being formed with lateral flanks at an angle. Applicants reviewed this reference and found it to be no more pertinent than the prior art relied upon by the Examiner in the rejections.

In view of the amendments to the claims and the above arguments, Applicants believe that the claims of record now define patentable subject matter over the art of record. Accordingly, an early Notice of Allowance is respectfully requested.

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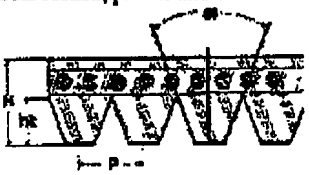
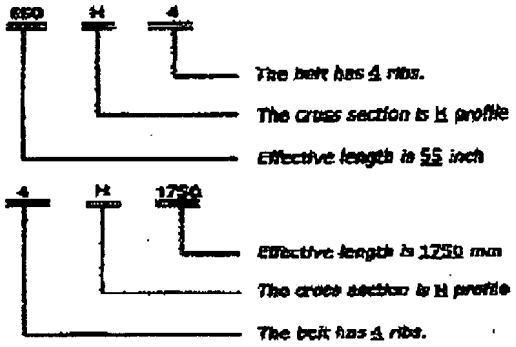
Home » CAN-DRIVE™ » Power Transmission Belt » Poly-v Belt

Cross section, profile and measurement of Poly-v belt



profile	pitch: P	height: ht	height of belt: H	angle of rib:
H	1.6	1.1	3.0 ± 0.15	40° ± 2°
J	2.34	1.8	3.9 ± 0.25	40° ± 2°
K	3.56	2.4	5.5 ± 0.30	40° ± 2°
L	4.7	4.6	9.0 ± 0.40	40° ± 2°
M	9.4	9.4	16.0 ± 0.60	40° ± 2°

EXAMPLE ILLUSTRATIONS



Profile H series

Metric No.	Part No.	Metric No.	Part No.	Metric No.	Part No.
H 519	204 H	H 979	385 H	H 1549	610 H
H 536	211 H	H 990	390 H	H 1552	611 H
H 556	219 H	H 999	393 H	H 1565	616 H
H 581	229 H	H 1015	400 H	H 1596	628 H
H 600	236 H	H 1043	411 H	H 1627	641 H
H 614	242 H	H 1065	419 H	H 1635	644 H
H 622	245 H	H 1081	426 H	H 1659	653 H
H 638	251 H	H 1083	427 H	H 1678	661 H
H 644	254 H	H 1090	429 H	H 1744	687 H
H 657	259 H	H 1093	430 H	H 1750	689 H
H 668	263 H	H 1106	435 H	H 1806	711 H
H 679	267 H	H 1137	448 H	H 1841	725 H
H 691	272 H	H 1150	453 H	H 1863	733 H

TB 15-14 Keilrippenriemen und Keilrippenscheiben nach DIN 7867
(Tabellenwerte in Anlehnung an DIN 7867 und Werksangaben)

			PH	PJ	PK	PL	PM
Keilrippenriemen nach DIN 7867	Profil-Kennzeichen						
	Rippenabstand	s	$1{,}60 \pm 0{,}2$	$2{,}34 \pm 0{,}2$	$3{,}56 \pm 0{,}2$	$4{,}70 \pm 0{,}2$	$9{,}40 \pm 0{,}2$
	Riemenhöhe	h max[1]	3	4	6	10	17
	Anzahl der Rippen	z[2]	2…31	2…50	2…50	2…50	2…43
	Riemenbreite	b	$b = s \cdot z$				
	Rippengrundradius	r_g max	0,15	0,20	0,25	0,40	0,75
	Rippenkopfradius	r_k min	0,30	0,40	0,50	0,40	0,75
	Standard-Richtlänge L_d[2]	min	559	330	559	954	2286
		max	2154	2489	3492	6096	15266
	zul. Riemengeschwindigkeit	v max[2]	60 m/s	50 m/s	50 m/s	40 m/s	30 m/s
Keilrippenscheiben nach DIN 7867	Profil-Kennzeichen		H	J	K	L	M
	Rillenabstand	e	$1{,}60 \pm 0{,}03$	$2{,}34 \pm 0{,}03$	$3{,}56 \pm 0{,}05$	$4{,}70 \pm 0{,}05$	$9{,}40 \pm 0{,}08$
	Gesamtabstand	e	$e = (\text{Rippenanzahl } n - 1)\, e$ Toleranz für e: ±0,30				
	Richtdurchmesser	$d_{d\,min}$	13	20	45	75	180
		Stufung	nach DIN 323 Normzahlreihe R20 (s. TB 1-16)				
	Innenradius	$r_{i\,max}$	0,30	0,40	0,50	0,40	0,75
	Außenradius	$r_{a\,min}$	0,15	0,20	0,25	0,40	0,75
	Profiltiefe	t_{eff}[2]	1,93	2,96	3,45	4,92	10,03
	Randabstand	f_{min}	1,3	1,8	2,5	3,3	6,4
	Wirkdurchmesser	d_w	$d_w = d_a + 2h_t$				
	Bezugshöhe	h_b	0,8	1,25	1,6	3,5	5,0

[1] Maße nach Wahl des Herstellers
[2] Herstaller-Angaben: vorzugsweise nach DIN 323 R'40

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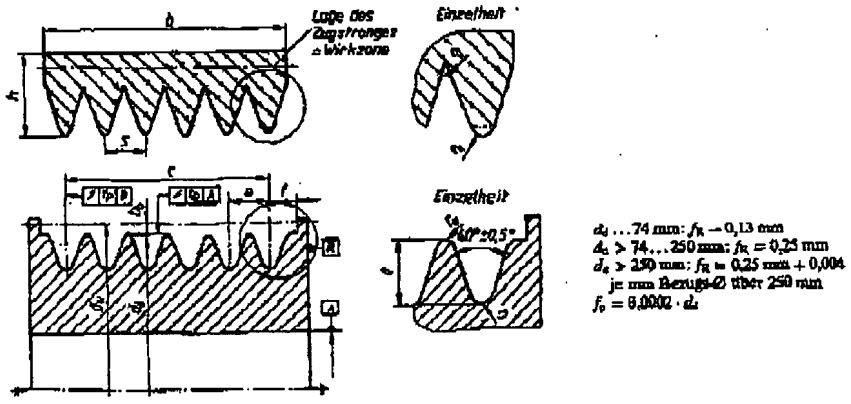

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